Mathematical Finance

## Prof. Giovanni Guastella

Text under revision. Not yet approved by academic staff.

COURSE AIMS AND INTENDED LEARNING OUTCOMES

The course aims to provide students with the basics of mathematical finance and the application tools for solving simple financial problems.

At the end of the course, students will have mastered the mathematical finance glossary and be able to independently analyse problems involving simple financial transactions, such as the amortisation of a loan and the issuing of an obligation. Students will also have acquired the ability to apply their knowledge to comparing different financial operations, be they financing or investment.

COURSE CONTENT

Introduction to the course.

Basic Concepts: simple capitalisation; compound capitalization; continuous capitalization; commercial discount; conventions on day counts for interest calculation; equivalent rates; convertible rates.

Bond Stocks: types of stocks; yield of a stock; net dividend, dividend rate, clean price and dirty price; internal rate of return; amortisation of a loan, the present value of an annuity; accumulation of capital, the future value of an annuity.

Interest rate term structure: arbitrage-free hypotheses; term structure and the IRR of bonds; duration; which stock offers the best value for money; gross rates and net rates; nominal rates and real rates; spot rates and forward rates; term structure theories; estimate of the term structure; micro and macroeconomic importance of the term structure; movements of the term structure.

READING LIST

R. Cesari, *Introduzione alla Finanza Matematica 2/ed: Concetti di base,* *tassi, obbligazioni*, McGraw Hill, 2012.

Additional teaching material and presentation slides will be made available by the lecturer.

TEACHING METHOD

Theoretical lectures and frontal tutorials.

ASSESSMENT METHOD AND CRITERIA

A written exam. The exam consists of short exercises referring to the different topics covered during the course. In solving the exercises, students will have to demonstrate mastery of the concepts and analysis tools and an ability to set and solve problems of an economic-financial nature. The various exam exercises are assessed independently, taking into account the correctness of the responses given and the clarity and correctness of the problem-solving process used.

Students are always given the option of a supplementary oral interview aimed at further assessing their actual knowledge of the course contents.

NOTES AND PREREQUISITES

The course offers the basic notions and tools for financial analysis and, as such, does not require any previous knowledge acquired in other economics courses.

Further information can be found on the lecturer's webpage at http://docenti.unicatt.it/web/searchByName.do?language=ENG or on the Faculty notice board.